

Process Safety Information

1	Introduction	2
2	Process Safety Information Source Documentation	2
3	Hazardous Chemicals in the Process	3
3.1	Index to Chemical Hazard Awareness Guides	6
4	Process Technology Overview	8
4.1	Area 01 & 2A: Coke Handling and Coke Grinding and Slurry	9
4.2	Area 2: Gasification Main Train	11
4.3	Area 2C: Spare Gasifier	14
4.4	Area 05: CO2 Purification	16
4.5	Area 06: Selexol Acid Gas Removal System	18
4.6	Area 07: PSA and Recycle Compressor	21
4.7	Area 08: Ammonia Synthesis	23
4.8	Area 09: Utilities	25
4.9	Area 10A: Urea Plant	28
4.10	Area 10B: Nitric Acid Plant #1	30
4.11	Area 10C: Ammonium Nitrate Plant and UAN	32
4.12	Area 11: Storage and Loading	34
4.13	Area 12A: Nitric Acid Plant #2	36
4.14	Area 12B: Ammonium Nitrate and UAN #2	39
4.15	Area 14: DEF	41

Process Safety Information

1 Introduction

The compilation of written process safety information (PSI) provides the employees and contractors at the Coffeyville Resources Nitrogen Fertilizers, LLC (CRNF) Plant with the information required to identify and understand the hazards of our processes. This guide will document where PSI can be found and provide a quick reference to the more commonly needed information. The PSI is necessary for a variety of functions such as employee training, hazard evaluations, incident investigations, community awareness, emergency planning, fire/loss prevention, and regulatory officials.

Some PSI contains confidential information from CRNF process licensors and may not be copied or removed from the CRNF facility without permission from the Plant Manager.

2 Process Safety Information Source Documentation

Primary Source Documentation for process safety information (PSI) area as follows:

Gasification and Ammonia Facilities

- (b) (4)
-

1500 STPD UAN 32% Solution Facility

- (b) (4)
-

3000 STPD UAN 32% Solution Expansion

- (b) (4)

Anhydrous Ammonia & UAN Storage and Distribution Facility

- (b) (4)

Operating Procedures and Manuals.

Operating Procedures Manuals contain the following information:

- Design Basis
- Process Description
- Initial Startup
- Normal Startup
- Normal Shutdown
- Emergency Shutdown

Process Safety Information

- Operating Limits and Consequences of Deviations
- Appendices
 - Process Flow Diagrams (PFD)
 - Piping and Instrument Diagrams (P&ID)
 - Equipment Data

Safety office

- Safety Data Sheets (Paper and electronic copies)
- Safety Policies and Procedures

Technical Services

- Technical Library
 - Project Files
 - Equipment Files
 - Vendor Catalogs
 - Drawing Stick Files
- Process Safety files
 - Management of Change (MOC) files
 - Process Hazard Analysis (PHA) files

3 Hazardous Chemicals in the Process

The following are highly hazardous chemicals that are present at or above the threshold quantity (TQ) at the CRNF Plant that is regulated under OSHA 1910.119 and EPA 68 subpart D.

CHEMICAL NAME	CAS NO.	TQ (LBS)	MAX. INVENTORY (LBS)
Anhydrous Ammonia	7664-41-7	10,000	41,440,000
Hydrogen Sulfide	7783-06-4	1,500	700
Nitric Oxide	10102-43-9	250	800
Nitrogen Dioxide	10102-44-0	250	2,100

The following chemicals are stored in large quantities on site and present a hazard whether the facility is running or shutdown.

CHEMICAL NAME	CAS NO.	MAX. STORAGE (LBS)
Anhydrous Ammonia	7664-41-7	41,200,000
Aqua Ammonia	1336-21-6	1,200
Ammonium Lignosulfonate	8061-53-8	200,000
Nalco Nitrosolve 220	Proprietary	40,000
Nitric Acid	7697-37-2	450,000

Process Safety Information

Petroleum Coke	64741-79-3	150,000,000
Selexol	9004-74-4	70,000
Sulfuric Acid	7664-93-9	173,000
UAN Solution	57-13-6	124,680,000

The following chemicals are not stored and are present only while the facility is running and until the units are purged and cleaned after shutdown.

CHEMICAL NAME	CAS NO.	MAX. INVENTORY (LBS)
Ammonium Nitrate	6484-52-2	216,000
Hydrogen sulfide	7783-06-4	700
Nitric Oxide	10102-43-9	800
Nitrogen Dioxide	10102-44-0	2,100
Liquid Urea	57-13-6	18,000

The following chemicals are stored in buildings or in vessels with limited opportunity for exposure to personnel. These chemicals are used in the utility area for water treatment, vehicle fuel, or as catalyst in the process.

CHEMICAL NAME	CAS NO.	MAX. INVENTORY (LBS)
Brine (NaCl salt) Solution	7647-14-5	50,000
BW-5057 (potassium hydroxide, sodium molybdate)	1310-58-3, 7631-95-0	7,900
BW-8065 (3-methoxypropylamine, morpholine)	5332-73-0, 110-91-8	8,300
BW-6000 (DEHA, ethanamine, N-ethyl-n-hydroxy, hydroquinone)	3710-84-7, 123-31-9	3,200
Sodium Hypochlorite (Bleach)	7681-52-9	40,500
AF-600 (RO Antiscale)	None	3,100
BC-118 (biocide, polyethylene glycol)	25322-68-3	1,000
38% Sodium Bisulfite (sodium bisulfite, water)	7681-57-4, 7732-18-5	2,750
PL-900 (coagulant)	None	2,800
CW-1010 (phosphate compound, sodium tolytriazole)	Proprietary, 644665-57-2	27,000
CW-2040 (scale inhibitor)	none	10,050

Process Safety Information

Purate (Sodium Hypochlorate)	7647-15-6	15,000
MS-315 (Alkyl aulfonic acid salt)	Proprietary	8,000
CW-400 (zinc chloride)	7646-85-7	3,100
CW-355 (sodium tolytriazole)	64665-57-2	2,700
20 BE Hydrochloric Acid		1,000
50% Caustic Soda (sodium hydroxide)	1310-73-2	28,000
CS-996 (Aluminum Chlorohydrate)	12042-91-0	58,000
Hydrex 3228 (Aluminum Chlorohydrate)	12042-91-0	2,900
Hydrex 6161 (Flocculent)	None	500
Hydrex 6692 (Distillates, (petroleum), hydrotreated light, ADIPIC acid, citric acid, isopropyl alcohol)	64742-47-8, 124-04-9, 77-92-9, 67-63-0	2,700
Nalco 7348 (Dispersant)	None	2,600
Hydrex 2982 (Antifoam)	None	500
Hydrex 2913 (Sodium Nitrite)	7632-00-0	600
Hydrate Lime (Calcium Hydroxide)	1305-62-0	80,000
Diesel Fuel	68476-34-6	3,000
Gasoline	8006-61-9	1,800
SSK-10 1/10" QL Haldor Topsoe	1344-28-1	222,000
KATALCO 32-4 Zinc Oxide Catalyst	1314-13-2	84,000
PURAVOC 50B Oxidation Catalyst	1344-28-1	3,200
KATALCO 35-4A Ammonia Synthesis	1309-38-2	200,000

The following chemical hazard awareness guides are a summary of the most pertinent information of the most common chemicals (including all regulated substances). The information discussed includes the chemical hazard, permissible exposure limits, toxicity information, physical data, reactivity data, corrosivity data, thermal and chemical stability, effects of inadvertent mixing, exposure control, and PPE requirements. Before handling any chemical for the first time, consult your supervisor, the safety manual, the appropriate procedure, and the Safety Data Sheet (SDS).

<p>COFFEYVILLE RESOURCES[®] NITROGEN FERTILIZERS <i>A CVR Partners, LP Company</i></p> <p>Process Safety Information</p>	<p>Standard No. EHS -240-02-001 Page 6 of 44 Revision 12/16/2015 Issue Date 04/01/2013</p>
--	---

3.1 Index to Chemical Hazard Awareness Guides

Anhydrous Ammonia

Ammonium Carbamate (Liquid solution)

Ammonium Nitrate (Liquid)

Aqua Ammonia (29%)

Carbon Dioxide

Carbon Monoxide

Hydrogen

Hydrogen Sulfide

Nitric Acid

Nitric Oxide

Nitrogen Dioxide

Selexol (97+% Polyethylene Glycol dimethyl Ether)



Standard No.	EHS -240-02-001
Page	7 of 44
Revision	12/16/2015
Issue Date	04/01/2013

Process Safety Information

Sulfur Dioxide

Sulfuric Acid

Urea (liquid)

Urea-Ammonium Nitrate (UAN) Solution

Ammonium Lignosulfonate (ALS)

Nalco Nitrosolve 220 (UAN corrosion inhibitor)

Petroleum Coke

Process Safety Information

4 Process Technology Overview

An overview of the information pertaining to the process technology is provided in this section. The information provided includes a process description, process chemistry, feedstocks, products, process temperatures and pressures, major components, safety hazards, exposure potentials, electrical classification, block flow diagram, and plot layout. This information is organized into the following plant areas:

MOC Designation	Area Reference	Drawing Reference	Area Name
01	01	01	Coke Handling
2A	02	02	Coke Grinding and Slurry
2B	03	03	2B Gasification Train
2C	04	04	2C Gasifier
05	05	05	CO ₂ Purification
06	06	06	Selexol Acid Gas Removal
07	07	07	PSA and Recycle Compressor
08	08	08	Ammonia Synthesis
09	09	09	Utilities
10A	10	10	Urea Plant
10B	10	10	Nitric Acid #1
10C	10	10	Ammonium Nitrate and UAN #1
11A	11	11	Ammonia Storage and Loading
11B	11	11	UAN Storage and Loading
12A	12	12	Nitric Acid #2
12B	12	12	Ammonium Nitrate and UAN #2
13	13	*	General Plant
14	14	14	DEF
			* No drawing reference number

Areas 01 and 2A have been combined into one PSI section for simplicity. Because of the complexity of the UAN unit, its PSI was further divided into the individual plants.

All process areas require personnel noise protection.

Some PSI contains confidential information from CRNF process licensors and may not be copied or removed from the facility without permission from the Plant Manager.

Process Safety Information

4.1 Area 01 & 2A: Coke Handling and Coke Grinding and Slurry

4.1.1 Process Description

(b) (4)



4.1.2 Process Chemistry

(b) (4)



4.1.3 Feedstocks

(b) (4)



4.1.4 Products

(b) (4)



4.1.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.1.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.1.7 Safety Hazards

(b) (4)

4.1.8 Exposure Potentials

(b) (4)

(b) (4) Consult the MSDS and chemical awareness guides.

4.1.9 Electrical Classification

(b) (4)

Process Safety Information

4.2 Area 2B: 2B Gasification Train

4.2.1 Process Description

(b) (4)



4.2.2 Process Chemistry

(b) (4)



4.2.3 Feedstocks

(b) (4)



4.2.4 Products

(b) (4)



Process Safety Information

4.2.5 Process Temperatures and Pressures

(b) (4)



4.2.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
---------------	----------------	---------------	----------------

(b) (4)



Process Safety Information

4.2.7 Safety Hazards

(b) (4)

4.2.8 Exposure Potentials

(b) (4)

4.2.9 Electrical Classification

(b) (4)

Process Safety Information

4.3 Area 2C: 2C Gasifier

4.3.1 Process Description

(b) (4)



4.3.2 Process Chemistry

(b) (4)



4.3.3 Feedstocks

(b) (4)



4.3.4 Products

(b) (4)



4.3.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.3.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.3.7 Safety Hazards

(b) (4)

4.3.8 Exposure Potentials

(b) (4)

4.3.9 Electrical Classification

(b) (4)

Process Safety Information

4.4 Area 05: CO2 Purification

4.4.1 Process Description

(b) (4)



4.4.2 Process Chemistry

(b) (4)



4.4.3 Feedstocks

(b) (4)



4.4.4 Products

(b) (4)



4.4.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.4.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.4.7 Safety Hazards

(b) (4)

4.4.8 Exposure Potentials

(b) (4)

4.4.9 Electrical Classification

(b) (4)

Process Safety Information

4.5 Area 06: Selexol Acid Gas Removal System

4.5.1 Process Description

(b) (4)



4.5.2 Process Chemistry

(b) (4)



4.5.3 Feedstocks

(b) (4)



4.5.4 Products

(b) (4)



4.5.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.5.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.5.7 Safety Hazards

(b) (4)

Process Safety Information

4.5.8 Exposure Potentials

(b) (4)



4.5.9 Electrical Classification

(b) (4)



Process Safety Information

4.6 Area 07: PSA and Recycle Compressor

4.6.1 Process Description

(b) (4)



4.6.2 Process Chemistry

(b) (4)



4.6.3 Feedstocks

(b) (4)



4.6.4 Products

(b) (4)



4.6.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.6.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.6.7 Safety Hazards

(b) (4)

4.6.8 Exposure Potentials

(b) (4)

4.6.9 Electrical Classification

(b) (4)

Process Safety Information

4.7 Area 08: Ammonia Synthesis

4.7.1 Process Description

(b) (4)



4.7.2 Process Chemistry

(b) (4)



4.7.3 Feedstocks

(b) (4)



4.7.4 Products

(b) (4)



4.7.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.7.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.7.7 Safety Hazards

(b) (4)

4.7.8 Exposure Potentials

(b) (4)

4.7.9 Electrical Classification

(b) (4)

Process Safety Information

4.8 Area 09: Utilities

4.8.1 Process Description

(b) (4)



4.8.2 Process Chemistry

(b) (4)



Process Safety Information

(b) (4)



4.8.3 Feedstocks

(b) (4)



4.8.4 Products

(b) (4)



4.8.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.8.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.8.7 Safety Hazards

(b) (4)

4.8.8 Exposure Potentials

(b) (4)

4.8.9 Electrical Classification

(b) (4)

Process Safety Information

4.9 Area 10A: Urea Plant

4.9.1 Process Description

(b) (4)



4.9.2 Process Chemistry

(b) (4)



4.9.3 Feedstocks

(b) (4)



4.9.4 Products

(b) (4)



4.9.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.9.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.9.7 Safety Hazards

(b) (4)

4.9.8 Exposure Potentials

(b) (4)

4.9.9 Electrical Classification

(b) (4)

Process Safety Information

4.10 Area 10B: Nitric Acid Plant #1

4.10.1 Process Description

(b) (4)



4.10.2 Process Chemistry

(b) (4)



4.10.3 Feedstocks

(b) (4)



4.10.4 Products

(b) (4)



4.10.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.10.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.10.7 Safety Hazards

(b) (4)

4.10.8 Exposure Potentials

(b) (4)

4.10.9 Electrical Classification

(b) (4)

Process Safety Information

4.11 Area 10C: Ammonium Nitrate Plant and UAN #1

4.11.1 Process Description

(b) (4)



4.11.2 Process Chemistry

(b) (4)



4.11.3 Feedstocks

(b) (4)



4.11.4 Products

(b) (4)



4.11.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.11.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.11.7 Safety Hazards

(b) (4)

4.11.8 Exposure Potentials

(b) (4)

4.11.9 Electrical Classification

(b) (4)

Process Safety Information

4.12 Area 11: Storage and Loading

4.12.1 Process Description

(b) (4)

4.12.2 Process Chemistry

(b) (4)

4.12.3 Feedstocks

(b) (4)

4.12.4 Products

(b) (4)

4.12.5 Process Temperatures and Pressures

(b) (4)

4.12.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

Process Safety Information

4.12.7 Safety Hazards

(b) (4)

4.12.8 Exposure Potentials

(b) (4)

4.12.9 Electrical Classification

(b) (4)

Process Safety Information

4.13 Area 12A: Nitric Acid Plant #2

4.13.1 Process Description

(b) (4)



4.13.2 Process Chemistry

(b) (4)



4.13.3 Feedstocks

(b) (4)



4.13.4 Products

(b) (4)



4.13.5 Process Temperatures and Pressures

(b) (4)



<p>COFFEYVILLE RESOURCES NITROGEN FERTILIZERS <i>A CVR Partners, LP Company</i></p> <p>Process Safety Information</p>	<p>Standard No. EHS -240-02-001 Page 37 of 44 Revision 12/16/2015 Issue Date 04/01/2013</p>
--	--

4.13.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.13.7 Safety Hazards

(b) (4)

Process Safety Information

4.13.8 Exposure Potentials

(b) (4)

4.13.9 Electrical Classification

(b) (4)

Process Safety Information

4.14 Area 12B: Ammonium Nitrate Plant and UAN #2

4.14.1 Process Description

(b) (4)



4.14.2 Process Chemistry

(b) (4)



4.14.3 Feedstocks

(b) (4)



4.14.4 Products

(b) (4)



4.14.5 Process Temperatures and Pressures

(b) (4)



Process Safety Information

4.14.6 Major Components

Equipment No.	Equipment Name	Equipment No.	Equipment Name
(b) (4)			

4.14.7 Safety Hazards

(b) (4)

4.14.8 Exposure Potentials

(b) (4)

4.14.9 Electrical Classification

(b) (4)

Process Safety Information

4.15 DEF Production

4.15.1 Process Description

(b) (4)

4.15.2 Process Chemistry

(b) (4)

4.15.3 Feedstocks

(b) (4)

4.15.4 Products

(b) (4)

4.15.5 Process Temperatures and Pressures

(b) (4)

4.15.6 Major Components

Equipment No.	Equipment Name
(b) (4)	

Process Safety Information

4.15.7 Safety Hazards

(b) (4)

4.15.8 Exposure Potentials

(b) (4)

4.15.9 Electrical Classification

(b) (4)